CLAIMS

What we claim is:

1. A method of inhibiting the infectivity of HIV, said method comprising the steps of:
   (a) contacting an HIV virion with a composition comprising a serpin, or a analog thereof; and
   (b) incubating said virion with said serpin, or analog thereof, for a period of time sufficient to inhibit the infectivity of HIV.

2. The method of claim 1, wherein said serpin has the following characteristics:
   (i) inhibits serine protease; and
   (ii) binds heparin.

3. The method of claim 1, wherein said serpin is selected from a group consisting of: antithrombin, protein C-inhibitor, activated protein C, plasminogen activator inhibitor, and alpha-1-antitrypsin.

4. The method of claim 1, wherein said serpin is bovine-originated or human-originated.

5. The method of claim 1, wherein said serpin is selected from a group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

6. The method of claim 1, further comprising pretreating said serpin before contacting the serpin with the HIV virion.

7. The method of claim 6, wherein said pretreatment is contacting the serpin with elastase.

8. A method of decreasing the infectivity of HIV, if any is present, in a biological sample, the method comprising the steps of:

(a) identifying a biological sample in which a decrease or elimination of HIV infectivity is desirable; and

(b) contacting the biological sample with an amount of serpin, or analog thereof, sufficient to decrease the infectivity of HIV in the biological sample.

9. The method of claim 8, wherein said serpin has the following characteristics:

(a) inhibits serine protease; and

(b) binds heparin.

10. The method of claim 8, wherein said biological sample is selected from a group consisting of: blood, plasma, serum, saliva, semen, cervical secretions, urine, breast milk, and amniotic fluids.

11. The method of claim 8, wherein said serpin is selected from a group consisting of: antithrombin, protein C-inhibitor, activated protein C, plasminogen activator inhibitor, and alpha-1-antitrypsin.

12. The method of claim 8, wherein said serpin is bovine-originated or human-originated.

13. The method of claim 8, wherein said serpin is selected from a group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

14. The method of claim 8, further comprising pretreating said serpin before contacting the serpin with the biological sample.

15. The method of claim 14, wherein the pretreatment is contacting said serpin with elastase.

16. The method of claim 8, wherein the amount of said serpin is at least about 2 units per milliliter of the biological sample volume.

17. The method of claim 8, wherein the amount of said serpin is at least about 5 units per milliliter of the biological sample volume.

18. The method of claim 8, wherein the amount of said serpin is at least about 10 units per milliliter of the biological sample volume.

19. A method of treating HIV infection, the method comprising introducing into a cell susceptible to HIV infection a DNA molecule encoding a serpin, or analog thereof, and expressing said serpin, or analog thereof, in an amount sufficient to inhibit infection of the cell by the HIV.

20. The method of claim 19, wherein said DNA encodes a serpin selected from a group consisting of: antithrombin, protein C-inhibitor, plasminogen activator inhibitor, activated protein C, and alpha-1-antitrypsin.

21. The method of claim 19, wherein the expressed serpin has the following characteristics:
(a) inhibits serine protease; and
(b) binds heparin.

22. The method of claim 19, wherein said DNA encodes a serpin that is bovine-originated or human-originated.

23. The method of claim 19, wherein the expressed serpin is selected from the group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

24. A method of treating HIV infection in a subject, the method comprising introducing into the subject a producer cell that expresses a serpin, or analog thereof, in an amount sufficient to inhibit infection of an endogenous cell of the subject, the endogenous cell being susceptible to HIV infection.

25. The method of claim 24, wherein said serpin has the following characteristics:
(a) inhibits serine protease; and
(b) binds heparin.

26. The method of claim 24, wherein said serpin is selected from a group consisting of: antithrombin, protein C-inhibitor, activated protein C, plasminogen activator inhibitor, and alpha-1-antitrypsin.

27. The method of claim 24, wherein said serpin is bovine-originated or human-originated.

28. The method of claim 24, wherein said serpin is selected from a group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

29. A composition comprising a serpin, or analog thereof, associated with a surface.

30. The composition of claim 29, wherein said serpin has the following characteristics:
(a) inhibits serine protease; and
(b) binds heparin.

31. The composition of claim 29, wherein said surface is a bead, chip, column, or matrix.

32. The composition of claim 29, wherein said serpin is selected from a group consisting of: antithrombin, protein C-inhibitor, activated protein C, plasminogen activator inhibitor, and alpha-1-antitrypsin.

33. The composition of claim29, wherein said serpin is bovine-originated or human-originated.

34. The composition of claim 29, wherein said serpin is selected from a group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

35. A method of inhibiting the infectivity of HIV, said method comprising the steps of:

(a) contacting an HIV virion with a composition having a surface which comprises substantially purified serpin, or analog thereof, associated with said surface; and

(b) incubating said HIV virion with said serpin for a period of time sufficient to inhibit the infectivity of HIV.

36. The method of claim 35, wherein said surface is the composition of claim 29.

37. A pharmaceutical composition comprising in a therapeutically effective amount of a serpin, or analog thereof, to inhibit, to treat, or prevent HIV-infection, and a pharmaceutically acceptable carrier.

38. The composition of claim 37, wherein said serpin has the following characteristics:

(a) inhibits serine protease; and

(b) binds heparin.

39. The composition of claim 37, wherein said serpin is selected from a group consisting of: antithrombin, protein C-inhibitor, activated protein C, plasminogen activator inhibitor, and alpha-1-antitrypsin.

40. The composition of claim 37, wherein said serpin is bovine-originated or human-originated.

41. The composition of claim 37, wherein said serpin is selected from a group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

42. A kit comprising, in one or more containers, the pharmaceutical composition of claim 37.

43. A kit for detecting a protein which inhibits the infectivity of HIV, said kit comprising an antibody which specifically binds a serpin, or analog thereof.

44. The kit of claim 43, wherein said serpin has the following characteristics:
(a) inhibits serine protease; and
(b) binds heparin.

45. The kit of claim 43, wherein said serpin is selected from a group consisting of: antithrombin, protein C-inhibitor, activated protein C, plasminogen activator inhibitor, and alpha-1-antitrypsin.

46. The kit of claim 43, wherein said serpin is bovine-originated or human-originated.

47. The kit of claim 43, wherein said serpin is selected from a group consisting of: a 43 kDa modified antithrombin; R-antithrombin; S-antithrombin; or a combination thereof.

48. The kit of claim 43, wherein said detection reagent is selected from the group consisting of an enzyme and a radionuclide.